Curaliidae, a New Family of Heteroptera (Insecta: Hemiptera) from the Eastern United States

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ABSTRACT *Curalium cronini*, new genus and new species is described on the basis of 16 male specimens from the southeastern United States. The relationships of *Curalium* are discussed within the context of a phylogenetic analysis for the Heteroptera: Cimicomorpha. *Curalium* is placed within the Cimicomorpha, primarily on the basis of pretarsal structure, with the ventral arolium being absent and the dorsal arolium existing in the form of a peg-like dorsomedian sensillum. It is further placed in a clade with Joppeicidae and Velocipedidae as the sistergroup of the remaining members of the Cimiciformes, a lineage containing all predatory family-group taxa in the Cimicomorpha other than the Reduvioidea. *Curalium* uniquely possesses several autapomorphic features, including a collar-like pronotum, novel male genitalia, and enlarged proctiger; other characters which—in combination—contribute to its diagnosis include hemispherical eyes, reduced forewing venation, fusiform antennal segments III and IV, and two-segmented tarsi. Because its placement in any existing family would render the diagnosis of that family meaningless, this novel taxon is placed in the Curaliidae, new family. Color images of whole specimens and extensive line drawings and scanning electron micrographs of morphological details are provided.

KEY WORDS Heteroptera, Cimicomorpha, *Curalium*, new genus, phylogenetics

Heteroptera, or true bugs, comprise at present ≈85 families (Schuh and Slater 1995, Henry 1997). The majority of these families are rather well established and most of them can be diagnosed in an unequivocal way. Recent changes in the family level classification of the Heteroptera have resulted from efforts to establish monophyletic groups and to bring the classification into conformity with the results of phylogenetic analysis (Ford 1979, Schuh 1986, Schuh and Stys 1991, Henry 1997). Thus, the recent discovery of several specimens of a true bug, which cannot be placed in any existing genus, and which also lacks synapomorphies of any described family of Heteroptera, came as a surprise.

In the present article, we use high resolution digital imaging, incident and transmitted light microscopy, and scanning electron microscopy to describe and document the morphology of *Curalium cronini*, new genus and new species, a new taxon we place in the Curaliidae, new family. Infraordinal and family-group placement are discussed. Placement in the more basal infraorders can be excluded for a lack of synapomorphies shared with the well-defined groups Enicocephalomorpha (Schuh and Slater 1995, Wygodzinsky and Schmidt 1991) and Gerromorpha (Andersen 1982), leaving only the Dipsocoromorpha as a possibility. Such a placement would require independent loss of the ventral arolium and reduction of the dorsal arolium (Wheeler et al. 1993), together with a range of modifications of the head (e.g., the fusiform antenna), thorax (e.g., distinction between corium and membrane and the consequent loss or fusion of veins in the latter), and abdomen (e.g., the male genitalia) (Stys 1970, 1983; Schuh and Slater 1995). The absence of a ventral arolium and the presence of a corium suggest that the proposed family belongs to the Panheteroptera, even though it lacks the wing-to-body coupling device known as the *Druckknopf* (Wheeler et al. 1993, Schuh and Slater 1995: fig. 10.3E). No synapomorphies are shared with Nepomorpha (Mahner 1993), Leptopodomorpha (Schuh and Polhemus 1980), or Pentatomomorpha (Leston et al. 1954, Schuh and Slater 1995, Henry 1997), which leaves Cimicomorpha as the only reasonable placement. Assignment of *Curalium cronini* is therefore discussed in light of a phylogenetic analysis of relationships within the Cimicomorpha (Schuh et al. 2007).

Materials and Methods

Because of the very small size and novel morphology of this taxon within the suborder Heteroptera, we have used a variety of techniques to secure the max-

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imum amount of morphological information. The majority of specimens examined came to us preserved in alcohol. This method of preservation allowed for the use of transmitted light microscopy, which was done on a Nikon Eclipse 80i compound microscope. In preparation for examination with the scanning electron microscope, we treated a specimen in hexamethyldisilazane (Heraty and Hawks 1998). All measurements are in millimeters.

Institutional abbreviations used in the specimens examined section are as follows: AMNH, American Museum of Natural History, NY; FSCA, Florida State Collection of Arthropods, FL, Division of Plant Industry, Gainesville; JECC, J. Eric Cronin Collection, Gainseville, FL; TAMU, Texas A&M University, College Station; USNM, National Museum of Natural History, Smithsonian Institution, Washington, DC.

Systematics

Curaliidae Schuh, Weirauch, & Henry, new family

Type genus *Curalium* Schuh, Weirauch, & Henry, new genus.

Diagnosis. See generic diagnosis.
Description. See generic description.

Curalium Schuh, Weirauch, & Henry, new genus

Type species *Curalium cronini*, new species.

Diagnosis. Male: Recognized superficially by the very small size with respect to most members of the Heteroptera, total length ≈1.5 mm, and striking ruby-red coloration of the head, thorax, and cuneus (Fig. 1A and B). Head more or less pentagonal in dorsal view; eyes nearly hemispherical, situated anterolaterally in dorsal view and ventrolaterally in lateral or ventral view; ocelli large, widely separated; labium four-segmented, inserted anteriorly on head; antenna four-segmented, with segments III and IV weakly fusiform; pronotum short and collarlike, without posterior lobe; mesonotum tumid, completely exposed; mesothoracic wings coriaceous only along costal margin and on cuneus; tarsi of all legs two-segmented; pygophore visible only ventrally, completely covered by large proctiger in dorsal view.

Placed in the Cimicomorpha on the basis of pretarsal structure, including the absence of a ventral arolium on all legs and the development of the dorsal arolium as a peg-like dorsomedian sensillum. Whereas the dorsal arolium was considered to be completely absent in the Cimicomorpha in the work of Wheeler et al. (1993) and Schuh and Slater (1995), Weirauch (2005) has shown more recently that it is present in most members of the Cimicomorpha that have been studied in the form of a peg-like sensillum. Furthermore, in addition to the possession of both a dorsal and ventral arolium on at least one pair of legs in many members of the Dipsocoromorpha, the dipsocoromorphan pretarsus also may be of dissimilar structure on all pairs of legs, a condition not seen in *Curalium.*

Within Cimicomorpha this new taxon is most similar in size, body conformation, and having two-segmented tarsi to in the genus *Joppeicus* Puton (Joppeicidae), the genus *Loricula* Curtis (Microphysidae), and the genus *Embiophila* China (Plokiophilidae). It is readily distinguished from the above-mentioned taxa by the collarlike pronotum, exposed, tumid mesonotum, highly reduced, asymmetrical male genitalia, and the large proctiger (abdominal segment 10 and remnants of segment 11).

Also similar in size and body conformation, including the head, to small species of Anthocoridae, Lasiochilidae, and Lyctocoridae, but males in all of those groups have a large, sickle-shaped left paramere, filiform antennal segments 3 and 4, and a normally developed pronotum that obscures most or all of the mesonotum.

Description. *Male:* Very small (total length 1.75 mm), with short head, globose eyes, collarlike pronotum, and exposed mesonotum; macropterous; length apex clypeus–costal fracture 1.08, length head 0.21, width head 0.33, interocular distance 0.14, length antennal segment II 0.27, length pronotum 0.10, length scutellum 0.19, width scutellum 0.20, width pronotum 0.35, length cuneus 0.27. Coloration (Fig. 1A and B): head, thorax, and abdomen ruby red; appendages pale except for ruby-red coxae and reddish suffusion on base of labial segment III, distal part of antennal segment II, and all of antennal segments III and IV; corium and clavus largely transparent and weakly brownish except for red costal margin and cuneus and white marking proximal to cuneus. Surface and vestiture (Figs. 2D, G, and H; 3B and E–G; 4D and G; see also Fig. 5B and D): dorsum extremely smooth and highly polished, with a very few short, scattered, simple setae (Fig. 3E). Antennae, except nearly glabrous segment I, with abundant suberect setae nearly as long a segmental diameter (Figs. 3D and 4A). Apex of labial segment IV on ventral and apical surfaces with specialized sensory setae as in Figs. 2D and 3F and G. Head without cephalic setae (Fig. 3B). Coriaceous portion of forewing uniformly and densely covered with fine microtrichia (Fig. 4D, inset); membrane less densely covered with microtrichia. Legs virtually devoid of setae (Fig. 4G) except for a few short spine-like setae near apex of tibiae (Figs. 2G and H and 4H) and specialized paddle-shaped setae on dorsal surfaces of distal half of femora and tibiae (Figs. 2G and H and 4G). Structure: *Head* (Figs. 1A and B, 2A–D, and 3A–E): slightly wider than long, flattened in lateral view; compound eyes roughly hemispherical, removed from anterior margin of pronotum by length of eye in dorsal and lateral views, much more widely separated in dorsal view than in ventral view (compare Figs. 2A and B and 3B and D); ocelli relatively large, removed from inner margin of compound eye by less than half the diameter of an ocellus (Figs. 2A and 3B); anterior region of head short, weakly projecting beyond anterior margin of eyes; labium inserted anteriorly on head, clypeus more or less horizontal, roughly quad-

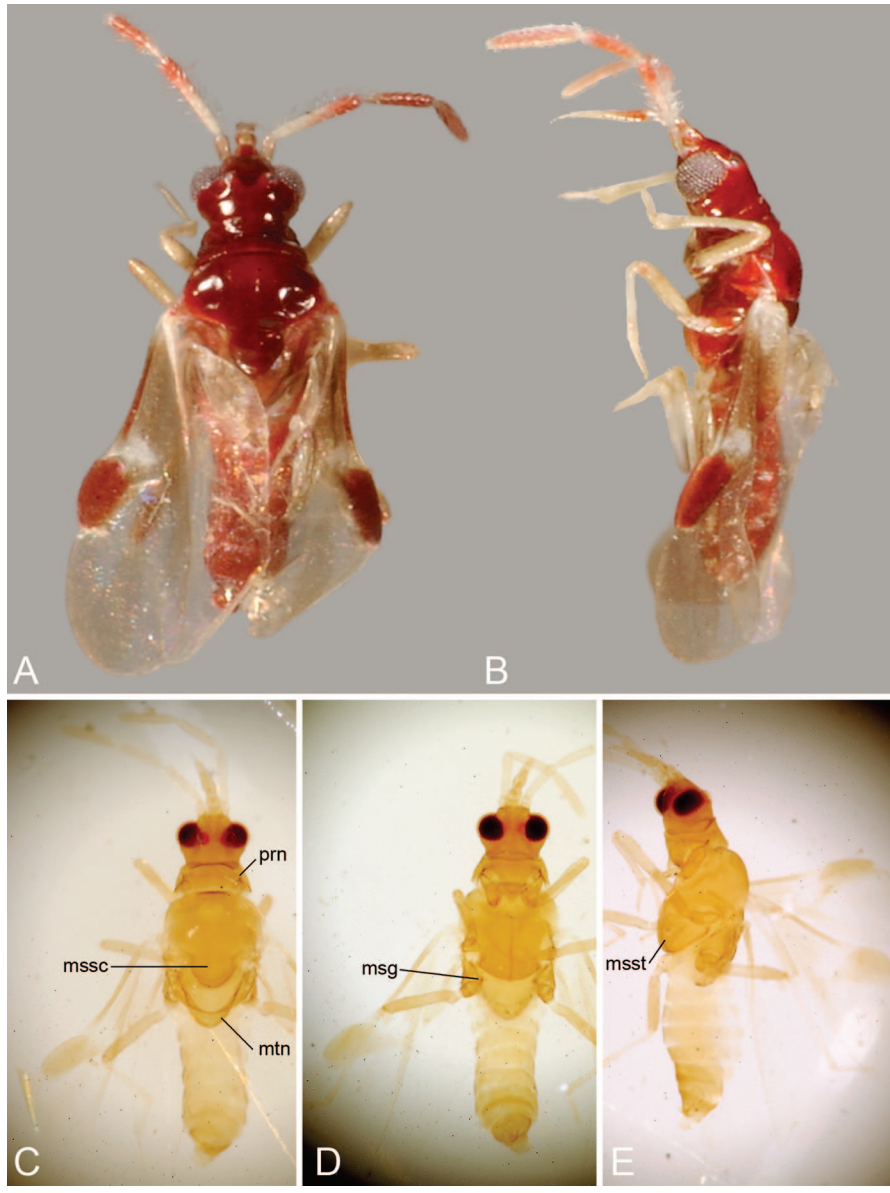

Fig. 1. *C. cronini.* Digital micrographs. (A) Dorsal view (incident light). (B) Lateral view (incident light). (C) Dorsal view (transmitted light). (D) Ventral view (transmitted light). (E) Lateral view (transmitted light). prn, pronotum; msg, metathoracic scent gland; mssc, mesoscutellum; msst, mesosternum; mtn, metanotum.

rate, slightly bulging; labrum elongate triangular, declivent to nearly vertical (Fig. 3B and C); mandibular and maxillary plates very small (Fig. 3E); buccula obsolete (Fig. 2B); labium relatively short, reaching to about middle of prosternum, segments I and II short and broad, segment III elongate and moderately stout, segment IV tapering to acuminate apex, and about one-half length of segment III (Figs. 2D and 3D), the observed maxillary stylet with three rows of bristles (Fig. 3H); antennal insertion ventral, antennal fossa located at anteroventral margin of eye (Figs. 2C and 3D); antenna relatively long, all segments of similar diameter, segment I short, slightly surpassing apex of head, segments II, III, and IV subequal in length, segments III and IV weakly fusiform (Figs. 1A and B and 2C). *Thorax: Prothorax* (Figs. 1A, 2C, 3A–D, and 4A): Pronotum short, collarlike, posterior lobe absent, leaving mesonotum completely exposed (Figs. 1A, 3A and B, 4A); propleuron short, proepisternum greatly reduced, proepimeron small, the former separated from the latter by a distinct short propleural sulcus; proepisternal and proepimeral supracoxal lobes present (2C); lateral margin of pronotum with a fold running anteroventrally and forming a deep lateral channel (Figs. 3C and 4A); prosternal xyphus large, broad, triangular,

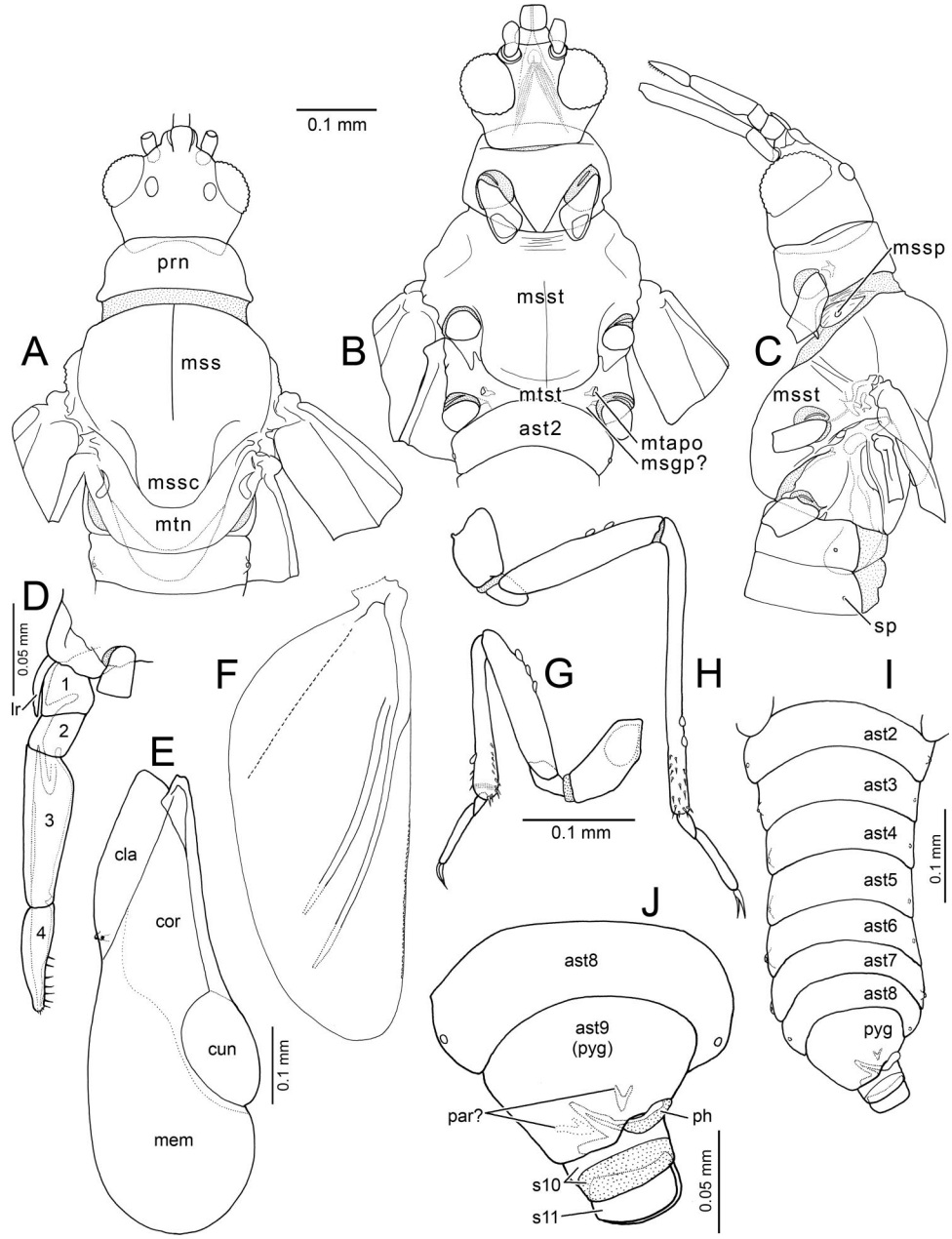

Fig. 2. *C. cronini*. Line drawings. (A) Head and thorax, dorsal view. (B) Head and thorax, ventral view. (C) Head and thorax, lateral view. (D) Labium, lateral view. (E) Forewing. (F) Hind wing. (G) Foreleg. (H) Hind leg. (I). Abdomen, ventral view. (J) Terminal abdominal segments, ventral view. ast, abdominal sternum; cla, clavus; cor, corium; cun, cuneus; lr, labrum; prn, pronotum; pyg, pygophore; mem, membrane; msgp, metathoracic scent gland pore; mss, mesoscutum; mssc, mesoscutellum; mssp, mesothoracic spiracle; msst, mesosternum; mtapo, metathoracic apophysis; mtn, metanotum; mtst, metasternum; par, paramere; ph, phallus; proc, proctiger; s, segment; sp, spiracle.

postcoxal portion of prosternum obsolete (Fig. 3D). *Mesothorax* (Figs. 1A, 2A and C, 3A and C, and 4A–C and F): Mesonotum completely exposed, very large relative to the condition seen in any other Heteroptera, moderately tumid, dorsal surface with an impressed median line (Figs. 1A, 2A and C, and 3A and B); scutellum tongue-shaped with a broadly rounded posterior margin, lacking frenum on lateral margin (Figs. 1A, 2A, and 3A); mesopleuron separated from mesonotum by a longitudinal groove (Figs. 2C and 3C); mesothoracic spiracle located on a distinct ovoid sclerite placed in a broadly exposed intersegmental membrane between pro- and mesothorax (Figs. 2C and 4A); mesepisternum large, broad, and divided by

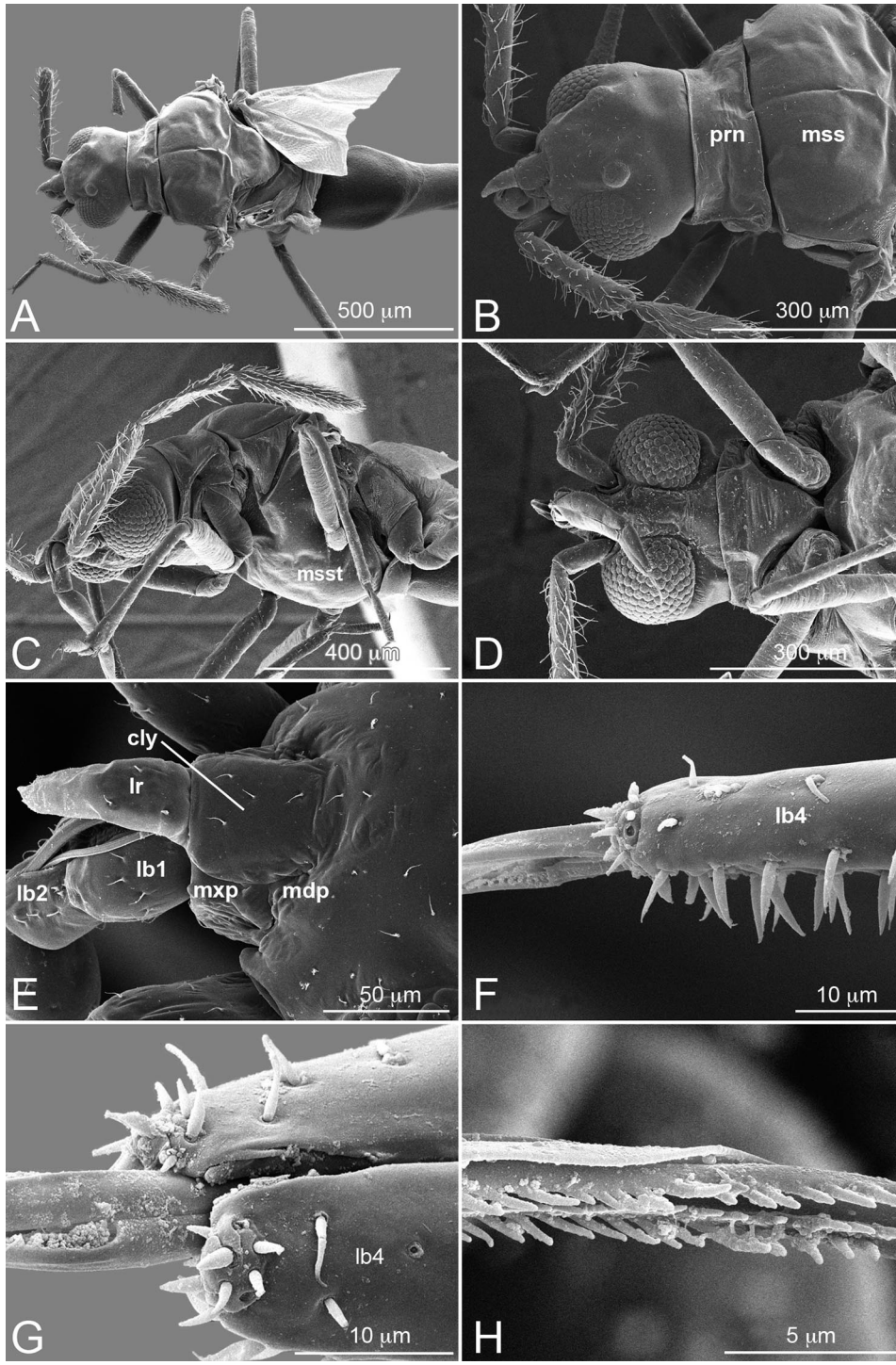

Fig. 3. *C. cronini.* Scanning electron micographs. (A) Head and thorax, dorsal view. (B) Head and thorax, dorsal view, detail. (C) Head and thorax, lateral view. (D) Head and prothorax, ventral view. (E) Clypeus and labrum, dorsal view. (F) Apex of labium, lateral view. (G) Apex of labium, dorsal view. (H) Maxillary stylets, near apex. cly, clypeus; lr, labrum; mdp, mandibular plate; mss, mesoscutum; msst, mesosternum; mxp, maxillary plate; lb1, labial segment 1; lb2, labial segment 2; lb4, labial segment 4; prn, pronotum.

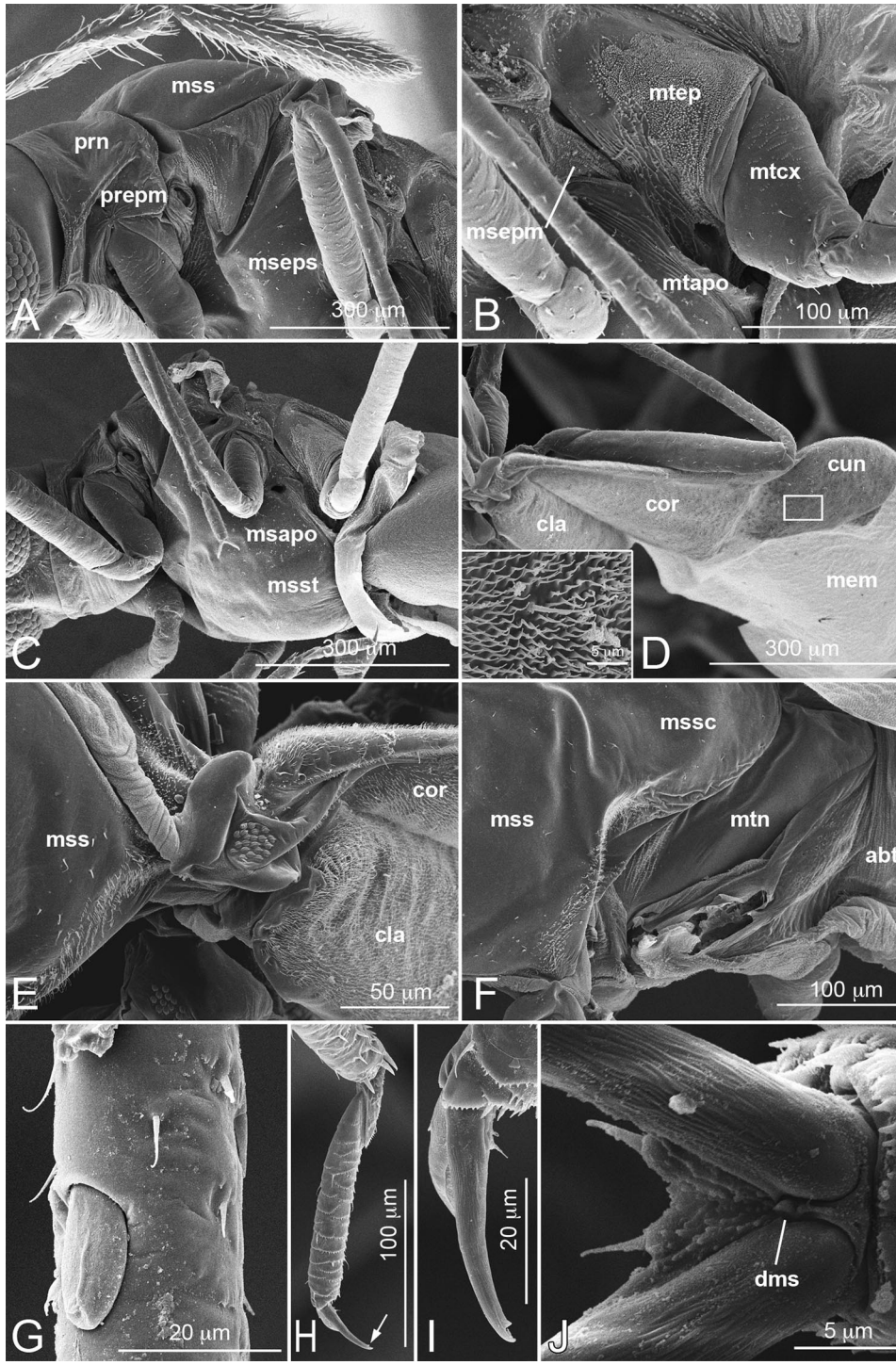

Fig. 4. *C. cronini*. Scanning electron micrographs. (A) Thorax, lateral view. (B) Thorax, lateral view, detail. (C) Thoracic venter, lateroventral view. (D) Right forewing, dorsal view; Inset: enlargement of surface of cuneus. (E) Forewing base and articulation, dorsal view. (F) Meso- and metathorax, left side, dorsal view, hind wing removed. (G) Middle tibia, detail of specialized paddle-shaped seta, dorsal view. (H) Foretarsus, lateral view. (I) Pretarsus, lateral view. (J) Pretarsus, frontoventral view. abt, abdominal tergum; cla, clavus; cor, corium; cun, cuneus; dms, dorsomedian sensillum (dorsal arolium); mem, membrane; msapo, apophysis of mesothoracic furca; msepm, mesepimeron; mseps, mesepisternum; mss, mesoscutum; mssc, mesoscutellum; msst, mesosternum; mtapo, apophysis of metathoracic furca; mtcx, metacoxa; mtep, metepisternum; mtn, metanotum; prepm, proepimeron; prn, pronotum.

a deeply impressed suture running obliquely from the wing base to the anteroventral margin of the segment (Figs. 2C and 4A); mesepimeron short and narrow, lacking *Druckknopf* (Schuh and Slater, 1995: fig. 10.3E) on the posterodorsal margin (Fig. 4B and F); mesosternum large, broad, and swollen, posterior margin evenly and broadly rounded, posterolateral margin with an apophysis appearing as a hole just behind the middle coxa (Fig. 4C). *Metathorax* (Figs. 1C–E, 2A and B, and 4B and F): Relatively long in dorsal view, metanotal phragma extending posteriorly into abdomen, rounded on posterior margin (Figs. 1C, 2A, and 4F); metepimeron large, as broad as base of hind coxa (Fig. 4B); metepisternal supracoxal lobe distinct, metepimeral supracoxal lobe minute (Fig. 4B); metepisternum obsolete medially, laterally with an apophysis appearing as a hole just anterior to hind coxa (Fig. 4B); metathoracic scent-gland evaporatory area, including peritreme, absent (Fig. 4B); opening of metathoracic gland possibly represented by a minute hole laterally on the metasternum in a position posteroventral to metathoracic hypophysis (Fig. 2B); apparent metathoracic scent gland/reservoir visible as a red globule located at medial margin of hind coxa, as observed with transmitted light (Fig. 1D). *Wings* (Figs. 1A, 2E and F, and 4D): Corium not strongly coriaceous, almost membranous but distinguished from membrane by dense cover of microtrichia on the former (Fig. 4D); costal margin of corium straight with cuneus heavily sclerotized and distinctly bulging laterally (Figs. 1A and 2E); membrane lacking veins (Fig. 2E); forewing-hindwing coupling in the form of a holding structure on the posterior margin of the clavus (Fig. 4E); hindwing with two longitudinal veins (Fig. 2F). *Legs* (Figs. 1B, 2B, C, G, and H, 3C, and 4H–J): Trochantins slender, elongate, clearly visible anterior to coxa in coxal articulatory membrane (Fig. 2B and C); coxae subcylindrical, of similar shape on all legs (Fig. 2C); femora elongate, slender, nearly parallel sided, devoid of spines (Figs. 1B, 2G and H, and 3C); tibia of foreleg increasing slightly in diameter distally, middle and hind tibiae cylindrical, of uniform diameter (Figs. 1B, 2H, and 3C); foretibia with a cleaning comb on medial surface at apex (Fig. 1B, 2G, 3C); fossula spongiosa absent (Fig. 4H); tarsi elongate, slender, two-segmented, segment one short, triangular, segment two much longer, nearly parallel sided (Figs. 2G and H and 4H); claws elongate, slender (Fig. 4H and I), evenly curving and tapering toward apex, with a small subapical tooth on ventral surface (Fig. 4H and I); parempodia setiform, short, of equal length (Fig. 4J), ventral arolium absent, and dorsal arolium developed as a peg-like dorsomedian sensillum (Fig. 4J). *Abdomen* (Figs. 2I and J and 5A–C): elongate, slightly broadened at base (Figs. 2I and 5A); tergites of segments 2–6 largely membranous, tergites 7 and 8 more strongly sclerotized (Fig. 5A and B); no pores or scars of dorsal abdominal scent glands visible with either transmitted light or scanning electron microscopy; sternites entire, weakly sclerotized, spiracles located near lateral margin of abdominal segments 2–8 (Figs. 2I and 5B); proctiger greatly enlarged, completely obscuring pygophore in dorsal view, abdominal segment 10 trapezoidal, longer medially than laterally, segment 11 subquadrate in dorsal view (Figs. 2I and J, 5C). Genitalia (Figs. 2I and J and 5D–F): *Pygophore (segment 9):* wider than long, flattened, visible only in ventral view, posterior margin asymmetrically tapering from right to left side (Figs. 2J and 5D); a V-shaped sclerotized area visible with transmitted light on posterior margin, possibly representing structures supporting the phallus (Fig. 2J). *Phallus* (Figs. 2J and 5D–F): Aedeagus lying on external surface of pygophore in available specimens; tubular, with membranous external surface, apex (as seen with scanning electron microscopy) ornamented with several outwardly pointing microtrichial spines arranged around apparent secondary gonopore (Fig. 5F); in transmitted light phallus apparently with weakly sclerotized rodlike structure (Fig. 2J). *Parameres* (Fig. 2I and J): small, slightly asymmetrical sclerotized V-shaped rods, lateral to the supporting sclerites of the phallus, observable with transmitted light, but not visible externally, probably representing parameres.

Etymology. The generic name is taken from the Latin word *curalium*, meaning red coral, in reference to the ruby-red coloration.

Curalium cronini, new species Schuh, Weirauch, & Henry

(Figs. 1–7)

Diagnosis. See generic diagnosis.

Description. See generic description.

Etymology. Named in honor of J. Eric Cronin, whose efforts in sorting light-trap samples revealed all but three of the known specimens.

Distribution (Fig. 6). USA: northern Florida, Louisiana.

Biology. The 19 known male specimens were collected in Florida and Louisiana, United States, by using UV light. The first bugs occur in the traps near the end of June, or early in July. Late July/early August seems to be another favorable time for collections. Based on the appearance of the rostrum, the bug is likely to be a predator.

Holotype. USA: Florida: Alachua Co.: Gainesville, 29.63527°N 82.37111°W, 24 m, 3-VIII-2007 - 5-VIII-2007, J. E. Cronin, Light Trap, 1;m (AMNH_ENT 00023878) (FSCA).

Paratypes. USA: Florida: Alachua Co.: 7925 SW 102nd Avenue, Gainesville, 29.561°N 82.427°W, 21 m, 30-VII-2007, R. T. Schuh and B. M. Massie, Light Trap, 1;m (AMNH_ENT 00023876) (AMNH); 1-VIII-2007, R. T. Schuh and B. M. Massie, Light Trap, 1;m (AMNH_ENT 00023877) (AMNH). Gainesville, 29.63527°N 82.37111°W, 24 m, 5-VIII-2002 - 6-VIII-2002, J. E. Cronin at Department of Plant Industry, Light Trap, 1;m (AMNH_PBI 00170734) (AMNH); 27-VI-2002 - 1-VII-2002, J. E. Cronin at Department of Plant Industry, Light Trap, 1;m (AMNH_PBI 00170735) (AMNH); 21-VI-2002- 24-VI-2002, J. E. Cronin at Department of Plant Industry, Light Trap, 1;m (AMNH_PBI 00170736) (AMNH); VII-1997, J. E. Cronin, Light Trap, 1;m (AMNH_

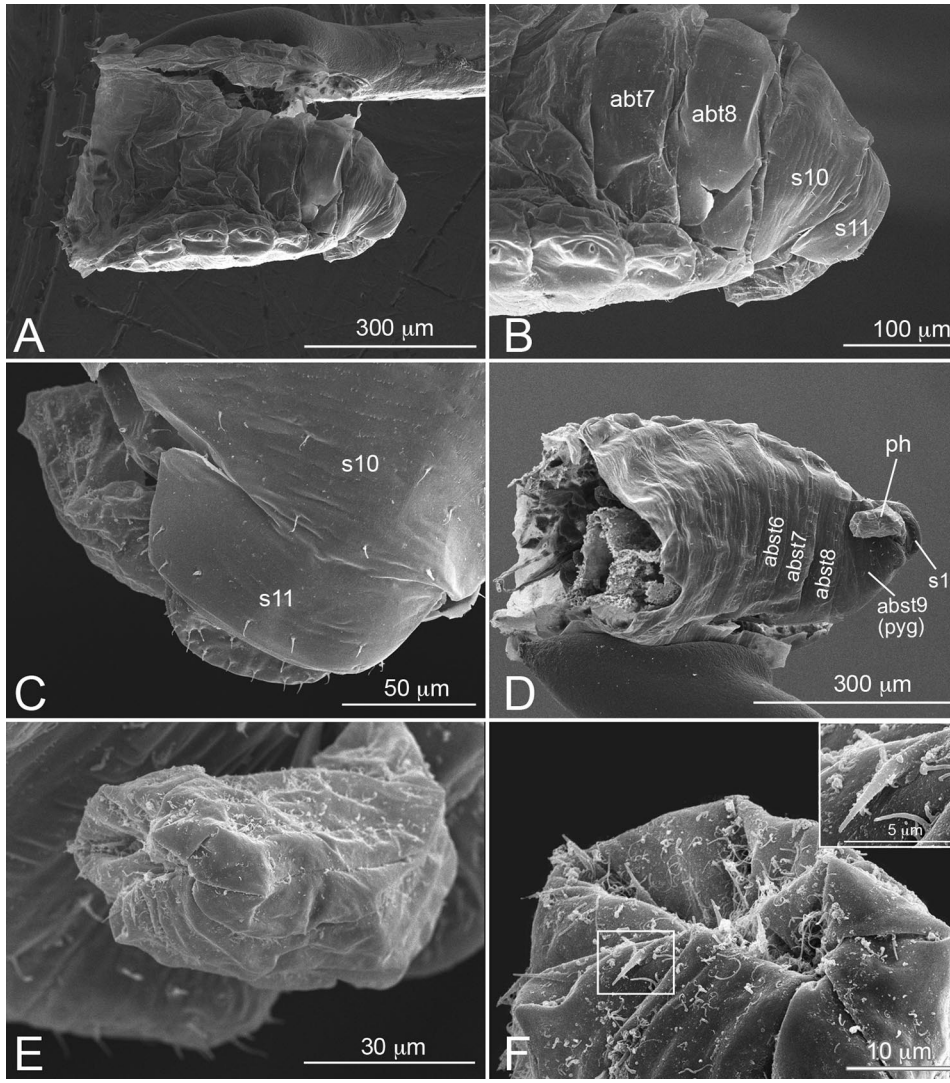

Fig. 5. *C. cronini.* Scanning electron micographs. (A) Abdomen, dorsal view. (B) Abdomen, dorsal view, detail of posterior half. (C) Abdomen, dorsal view, detail of apex. (D) Abdomen, ventral view. (E) Abdomen, ventral view, detail of posterior half. (F) Phallus, detail; inset: enlargement of microtrichial spine. abst, adominal sternum; abt, abdominal tergum; s10, abdominal segment 10; s11, abdominal segment 11; ph, phallus; pyg, pygophore.

PBI 00170737) (AMNH). Light Trap, 2;m (AMNH_PBI 00170738, AMNH_PBI 00170739) (FSCA). Light Trap, 1;m (AMNH_PBI 00170740) (USNM); 27-VIII-1997, J. E. Cronin, Light Trap, 1;m (AMNH_PBI 00170742) (USNM); 17-VII-1998, J. E. Cronin, Light Trap, 1;m (AMNH_PBI 00170732) (FSCA); 5-IX-1999, S. E. Halbert and J. E. Cronin, Light Trap, 1;m (AMNH_PBI 00170733) (FSCA); 2-VIII-1997, J. E. Cronin at Department of Plant Industry, Light Trap, 1;m (AMNH_PBI 00243721) (JECC); 19-IX-2006, J. E. Cronin at Department of Plant Industry, Light Trap, 1;m (AMNH_PBI 00243722) (JECC); 4-VIII-2003, J. E. Cronin at Department of Plant Industry, Light Trap, 1;m (AMNH_PBI 00243723) (FSCA); 16-VIII-2003, J. E. Cronin at Department of Plant Industry, Light Trap, 1;m (AMNH_PBI 00243724) (FSCA); 17-VIII-2003, J. E. Cronin at Department of Plant Industry, Light Trap, 1;m (AMNH_PBI 00243725) (FSCA). Louisiana: East Baton Rouge Co.: Baton Rouge, 30.45056°N 91.15444°W, 28-VII-1995, E. G. Riley, Light Trap, 1;m (AMNH_PBI 00170731) (TAMU).

Discussion

When the specimens on which the above-mentioned descriptions are based first became available for study, their family identity was in doubt because of the unusual combination of characters they possessed. Some of the most obvious features we observed were the large ocelli, hemispherical eyes, collarlike pronotum, and two-segmented tarsi. Not only was the family placement in doubt, but the sex of the specimens also remained in question, because the very small size and

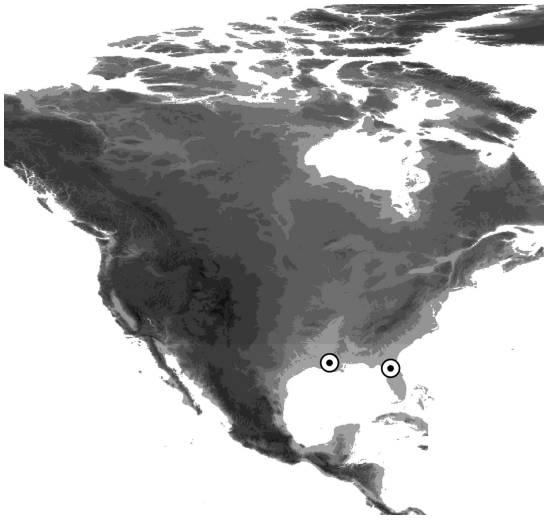

Fig. 6. Physical map of North America with known distribution of *C. cronini.*

the lightly sclerotized condition confounded our ability to understand structural details in the available specimens. Detailed light-microscopic examination of the eight pregenital abdominal segments allowed us to conclude that all known specimens are males as did later scanning electron microscopic examination of the pygophore and associated structures.

A preliminary phylogenetic analysis of Cimicomorpha based on morphological and molecular evidence (R.T.S., C. W., and W. Wheeler, unpublished data), and including morphological characters for *C. cronini*, provides the basis for our conclusions regarding the systematic position of *Curalium* within Heteroptera (Fig. 7). Characters from the analysis of R.T.S., C. W., and W. Wheeler (unpublished data) that support the monophyly of the Cimicomorpha are 1) labium inserted on anterior surface of head, 2) metathoracic scent-gland reservoirs paired, 3) greatly reduced dorsal arolium (see Weirauch, 2005), 4) membrane with one to three closed cells, 5) abdominal scent gland present between terga 5 and 6 in nymphs, and 6) spermatheca transformed into a vermiform gland. Characters 1 and 3 in this list are easily observed in *Curalium.* The metathoracic scent-gland reservoirs are apparently visible and may be paired; the membrane is without cells; and the condition for characters 5 and 6 remains unknown because both nymphs and females of *Curalium* are unknown.

At the next, more restrictive level in the hierarchy, *Curalium* is placed in the Cimiciformes, an inclusive taxon that comprises all predatory nonreduvioid cimicomorphans. Defining characters for this grouping include 1) membrane of forewing with one to three open cells; 2) 10–20 free veins emanating from closed cells in membrane of forewing, and 3) forward orientation of paramere. All of these characters exist in an altered form in *Curalium.*

Finally, *Curalium* is treated as the sister taxon of the Velocipedidae. Characters that support this relationship are the presence of four or five closed cells in the membrane, a condition that occurs only in the Velocipedidae. Thus, although the placement of *Curalium* within the Cimicomorpha seems reasonably secure, the character complement fixing its position near the base of the Cimiciformes is based on morphological characters that demonstrate significant amounts of homoplasy within the Cimicomorpha and in *Curalium. Curalium* does not possess a character complement

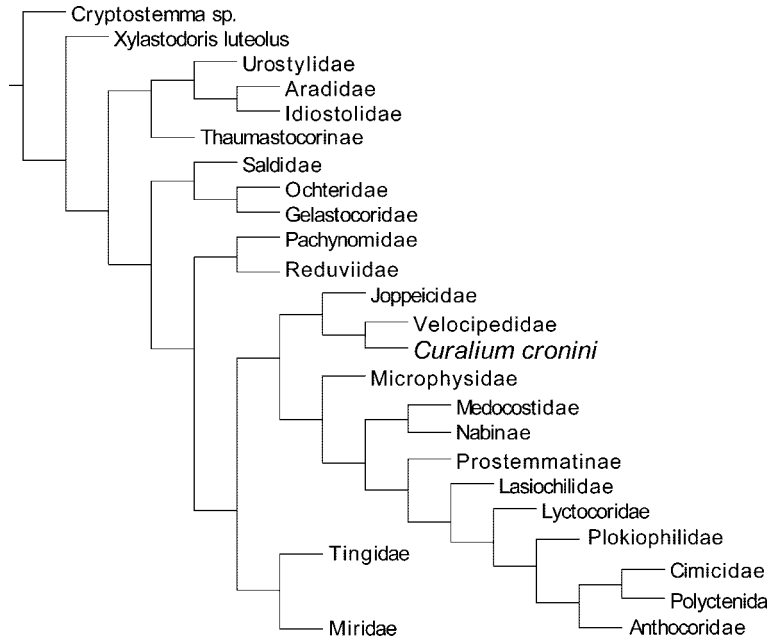

Fig. 7. Preliminary phylogenetic position of *Curalium* within the Cimicomorpha.

that will allow its placement in any existing family-group taxon within the Heteroptera, without rendering the diagnosis for the family meaningless.

As a consequence, we propose the new family Curaliidae, based on the above-described diagnosis and information contained in the description of the new genus *Curalium*, to accommodate its type species *C. cronini* new species. Refinement of knowledge concerning the systematic position of *Curalium* will only come through the acquisition of additional character data. We encourage the search for more specimens, most importantly females.

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